2011 Compensatory Mitigation Monitoring Report

L.E. CARPENTER & COMPANY

170 North Main Street
Block 301, Lot 1 and Block 801, Lot 3
Borough of Wharton
Morris County, New Jersey

NJDEP File #1439-04-0001.1

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Cardno JFNew Project #040229

December 9, 2011

319477

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INTRODUCTION

L.E. Carpenter & Company (LEC) implemented a Remedial Action Work Plan (RAWP) for the impacted portion of their ± 14.6-acre site (approximately 4.7 acres of disturbed area) located at 170 North Main Street, Borough of Wharton, Morris County, New Jersey (Figure 1). The site comprises Block 301, Lot 1 and Block 703, Lot 30 on the Borough of Wharton tax map. The project area is located in the USGS Dover, New Jersey quadrangle with center state plane coordinates of N 754326.5 E 470891.83 (NAD 1983) (Figure 2). A 2007 aerial photograph of the project site is also included (Figure 3).

Due to the parcel's previous utilization for mining and forging throughout the 1700's and 1800's, and vinyl manufacturing from 1943 to 1987, contaminated soils and groundwater were identified on the site. TRC (formerly RMT, Inc.), on behalf of LEC, worked with the U.S. Environmental Protection Agency (USEPA) and the New Jersey Department of Environmental Protection (NJDEP) to implement the RAWP for those impacted areas of the property.

As part of the RAWP, several "Hot Spots" (areas exhibiting either inorganic or organic contaminant concentrations in soil in excess of the 1994 Record of Decision (ROD) cleanup criteria) were identified across the site for removal. Several areas identified for contaminant removal overlapped with jurisdictional wetlands on site. A total of 0.337 acre of jurisdictional wetlands was temporarily impacted as a result of site remediation activities (Figure 4). This acreage consisted of a 0.003 acre and 0.009 acre lobe of forested/scrub-shrub wetland on site, 0.286 acre of forested/scrub-shrub and emergent marsh wetland to the east on the Wharton Enterprise property, and 0.039 acre of the Air Products open-water drainage channel relocation to the northeast. Due to the fact that project activities and wetlands extend off site onto adjacent properties, the project area or site referenced in this plan includes the LEC parcel, several acres of the Wharton Enterprises parcel to the east, and the Air Products drainage channel to the northeast.

Upon completion of cleanup activities, the entire 0.337 acre of wetland disturbance was restored and enhanced as more diverse emergent wetland communities. All temporary wetland impacts were restored and mitigated for at their current locations. A Wetland Mitigation Construction Final Report, dated August 28, 2005, was submitted to the NJDEP upon completion of restoration activities.

The main source of hydrology for the restored wetland is a direct surface water flow from the Rockaway River. The wetland area was restored to pre-cleanup grades. The intention was to restore and enhance the pre-existing wetland so that there is no-net loss of wetlands as a result of the clean-up work completed by LEC.

The primary means through which wetland vegetation will be established in the mitigation area is through planting native seed and bare root stock trees, as well as natural colonization from the adjacent wetland areas. For a list of planted species within the mitigation area and transition zone, see Appendix A.

MONITORING

Annual monitoring of the mitigation area was proposed originally for five years. Due to the installation of the monitoring wells on site and subsequent disturbance, the site has continued to

be monitored. Annual monitoring will continue unless it is apparent the wetland has been successfully established, upon which case the permittee will propose elimination of any subsequent reports in writing to the NJDEP. Only upon written concurrence from the NJDEP will any reporting requirements be eliminated.

LEC will submit annual reports to the NJDEP by December 31st of each monitoring year in accordance with the requirements outlined in the NJDEP Mitigation Project Monitoring Reports Checklist for Completeness. The monitoring reports will, at a minimum, include the following:

1. Photographs of the wetland mitigation areas.
2. Assessment of vegetative communities and evaluation of whether a dominance of wetland species exists (according to federal wetland indicator status of species identified).
3. Wildlife utilization evaluation.
4. Hydrology evaluation.
5. Soil evaluation.
6. Sediment loading evaluation.
7. Evaluation of sideslope and transition area conditions. Evaluation of overall progress toward successful achievement of wetland creation as designed, per each of the performance standards dictated for the project. Perform a comparative assessment between existing conditions and the performance standards.

This document will serve as the seventh annual monitoring report.

METHODS

A spring site visit was completed on May 25, 2011, followed by a thorough review of the mitigation site on September 19, 2011. During the May visit, conditions were partly cloudy with a 3 m.p.h. breeze and a temperature of 85° F while conditions were sunny and 70° F during the September site visit. During the May 25th and September 19th site visits, the invasive species of purple loosestrife (*Lythrum salicaria*) and reed canary grass (*Phalaris arundinacea*) were chemically treated. During the September site visit, autumn olive (*Elaeagnus umbellata*) and multiflora rose (*Rosa multiflora*) were cut and the stumps treated to prevent further spread of these species.

The wetland was walked using the random meander method. All plant species encountered during the walk-through were recorded on inventory data sheets until no new plant species were observed (Appendix B). Plant names were used as listed in Gleason and Cronquist (1991).

Three permanent transects were set up in order to measure percent cover of vegetation in the wetland (Figure 4). Several 1-m^2 plots were laid along the transect in order to measure the vegetative cover. A percent cover value was assigned to each species found in the plots. Total vegetative cover was calculated by averaging the vegetative cover from each plot along the transect (Appendix B).

Information on hydrology was collected using evidence provided by soil pits. Permanent reference points were located at the beginning of each transect so that water levels are recorded in the same location from year-to-year. The site was also inspected for problems such as erosion, sedimentation, and water quality issues. Signs of wildlife use were recorded during

the walk-through. Finally, permanent photopoint locations were identified and reference photographs were taken.

VEGETATIVE COMMUNITY

The data from the plots was used to describe the vegetative cover. Of the total wetland and transition areas, an average of 95% was vegetated and 5% was bare soil, which was a slight increase in vegetative cover by 1% from 2010. The total vegetative cover in the emergent zone was 96% (98% in 2010), while the vegetative cover of the forested zone was 95% (92% in 2010). The vegetative cover in the transition zone increased from 92% in 2010 to 94% in 2011. The total number of species has increased in both the emergent and forested zones, while the actual vegetative cover by native wetland indicator species increased slightly in the emergent zone, and remained the same in the forested zone compared to 2010 (Tables 1 and 2). The total number of species in the transition zone increased from 2010, and remains high considering the small size of the transition zone (Table 3).

Dominant species, based on relative cover (RC), in the emergent zone include tickle grass (*Agrostis hyemalis*) (32.6% RC), soft rush (*Juncus effusus*) (10.5% RC), and purple loosestrife (*Lythrum salicaria*) (9.9% RC). Dominant species in the forested/scrub-shrub zone include tickle grass (33.7% RC), tall goldenrod (*Solidago altissima*) (12.8% RC), grass-leaved goldenrod (*Euthamia graminifolia*) (8.2% RC), and broad leaved cattail (*Typha latifolia*) (8.2% RC). Dominant species in the transition zone include Indian grass (*Sorghastrum nutans*) (22.3% RC), redtop (16.7% RC), and grass-leaved goldenrod (14.8% RC).

Table 1. A summary of species diversity in the emergent zone

Year	Total # Species	# Native Wetland Indicator Species (NWIS)	# Native Species	Percent Vegetative Cover	Percent Actual Vegetative Cover by NWIS
2005	49	19 (39%)	29 (59%)	77%	11%
2006	46	24 (52%)	31 (67%)	90%	38%
2007	56	36 (64%)	44 (79%)	78%	31%
2008	48	24 (50%)	32 (67%)	89%	39%
2009	71	39 (55%)	50 (70%)	100%	41%
2010	86	43 (50%)	56 (65%)	98%	30%
2011	87	49 (56%)	59 (68%)	96%	31%

Table 2. A summary of species diversity in the forested/scrub-shrub zone

Year	Total # Species	# Native Wetland Indicator Species (NWIS)	# Native Species	Percent Vegetative Cover	Percent Actual Vegetative Cover by NWIS
2005	51	23 (45%)	34 (67%)	82%	10%
2006	53	29 (55%)	41 (77%)	98%	26%
2007	54	23 (43%)	36 (67%)	82%	41%
2008	70	37 (53%)	48 (69%)	98%	53%
2009	76	36 (47%)	55 (72%)	98%	55%
2010	92	42 (46%)	59 (64%)	92%	34%
2011	98	47 (48%)	68 (69%)	95%	34%

Table 3. A summary of species diversity in the transition zone

Year	Total # Species	# Native Wetland Indicator Species (NWIS)	# Native Species	Percent Vegetative Cover
2005	37	7 (19%)	19 (51%)	62%
2006	49	10 (31%)	28 (57%)	94%
2007	63	19 (30%)	39 (62%)	100%
2008	69	14 (20%)	38 (55%)	97%
2009	61	18 (30%)	34 (56%)	99%
2010	66	19 (29%)	37 (56%)	92%
2011	73	24 (33%)	42 (58%)	94%

The following invasive species were observed within the mitigation wetlands during the 2011 monitoring visits: reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), autumn olive (*Elaeagnus umbellata*), and multiflora rose (*Rosa multiflora*). Since the monitoring period began, purple loosestrife and reed canary grass have been found around the eastern perimeter of the emergent and forested zones. Two plants of common reed were identified while on site during the September site visit. This is the first site visit that common reed was identified within the mitigation boundaries. Autumn olive and multiflora rose were present in minimal numbers throughout the entire mitigation area. In the emergent zone, the relative cover of purple loosestrife was 7.4% RC in 2007, 4.9% RC in 2008, 3.8% RC in 2009, 4.5% RC in 2010, and 9.9% in 2011. Reed canary grass had a relative cover of 4.4% (2007-3.4% RC, 2008-2.7% RC, 2009-3.5%, 2010-4.4%). In the forested zone, purple loosestrife had a relative cover of 7.4% (2006-5.3% RC, 2007-4.2% RC, 2008-2.0% RC, 2009-3.5% RC, 2010-1.0%). Reed canary grass remained at 0.8% relative cover in the forested zone. These species will continue to be selectively treated using wetland-approved herbicides. Annual treatments will be performed twice each year through September 2012, or until invasive populations have been effectively controlled.

During the 2007 site visit, it was noted that all of the planted (June 28, 2005) bareroot trees and shrubs had died through a combination of drought conditions and deer predation. In May of 2008, 275 supplemental bareroot trees and shrubs were installed (Appendix A) with predator guards, to encourage sufficient coverage to meet mitigation requirements. During the August 28, 2008 site visit, 165 trees and shrubs were sampled to determine survival. Of the 165 sampled trees, a total of 73 live trees were counted (44.2% survival) in 2008, and 61 (37% survival) in 2009. During the 2010 site visit the total number of live trees sampled was 50 (30% survival), and none were found living during the 2011 site visit. Despite the fact that none of the planted bare root trees appear to have survived, a relatively high number of seedlings (≤6" height) have naturally become established within the emergent and forested areas. These seedlings consisted of swamp white oak (*Quercus bicolor*), silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), and cottonwood (*Populus deltoides*). As the seedlings become larger sampling of the woody vegetation within the mitigation area utilizing an appropriate sampling technique will be recommended.

MAINTENANCE

Invasive or noxious vegetation can oftentimes prevent or hinder the successful establishment of native species in a wetland mitigation area. For this reason, a routine wetland maintenance

program is being implemented at the LEC project site. This program includes semi-annual site visits to assess and treat (if necessary) any invasive species found on the property. Based on knowledge of the site and adjacent communities, chemical applications have been selected as the most effective maintenance tool for control of invasive species. Invasive species on the site were chemically treated on May 25 and September 19, 2011. As previously mentioned, additional invasive species control measures were implemented during the September 19, 2011, site visit. It had been noted during the 2010 site visits that autumn olive and multiflora rose were beginning to increase in the emergent and forested zones. These species were cut to within at least 6" of the ground and then a 50% glyphosate mixture was applied manually using a sponge. This method was chosen, despite being more labor intensive, due to its selectivity and minimal damage to surrounding vegetation.

As previously mentioned, the purple loosestrife population had increased from prior years. Only a few plants were seen that had already flowered. The majority of plants identified were less than 4 inches in height, which would indicate that they had germinated after the May 25th site visit. This was primarily due to the exceptionally wet growing season in 2011, which created ideal conditions for germination of the purple loosestrife seedbank. The herbicide application during the September site visit should be sufficient to help return the population to previous levels.

Any potential browsing damage by herbivores will be noted and addressed during routine maintenance site visits. Should the need arise, deer or goose fencing will be erected around the seeded areas to promote growth and restrict grazing or browsing. As stated earlier, all tree and shrub plantings in May 2008 were installed with predator guards to reduce possible herbivory.

Subsequent to permit issuance and after the restored wetland areas had been planted, several federal agency personnel raised a concern over the use of barnyard grass (*Echinochloa crusgalli*) in the wetland restoration seed mix. Due to the fact that several respected botanical sources disagree on the status of barnyard grass as a native versus non-native species, it was decided that barnyard grass populations on the project site will be monitored. If at any time it is determined that barnyard grass is having a detrimental effect on the mitigation area or prohibiting the establishment of other native species, it will be effectively controlled during the semi-annual maintenance site inspections. At this time, barnyard grass does not appear to be a long-term concern as it is not present within the forested zone transect, and has less than 1.0% relative cover within the emergent zone transect.

HYDROLOGY AND WATER QUALITY

Site conditions were very wet during the 2011 growing season. Hurricane Irene made landfall along the coast of New Jersey on August 28th. The fall site visit had been originally scheduled for the 6th of September, but due to flooding throughout the state and at the mitigation site, the visit was postponed until September 19th. During the September 19th site visit, the soil was saturated at the surface with up to 7 inches of inundation. Signs of flooding on the site were obvious and included downed, muddy vegetation and woody debris and trash that had floated onto the site from the adjacent Rockaway River. During the May 25th site visit, hydrology was present throughout the emergent and forested zones ranging from saturation at the surface to 4 inches of inundation in the emergent zone and 7 inches of inundation in the forested zone.

WILDLIFE HABITAT

Evidence of wildlife use was present in the mitigation wetland (Table 4). The presence of white-tailed deer and Canada Geese continue to be evident, though herbivory by these species does not appear to have caused detrimental harm to the herbaceous species. The complete loss of all planted trees in 2005 may be directly related to the herbivory by white-tailed deer. An increasing number of wildlife species were identified on site as seven new species were added to the list in 2011.

Table 4. Comprehensive list of wildlife observations in the mitigation wetland

SCIENTIFIC NAME	COMMON NAME
BIRDS	
Agelaius phoeniceus	Red-winged Blackbird
Ardea herodias	Great Blue Heron
Branta canadensis	Canada Goose*
Buteo jamaicensis	Red-Tailed Hawk
Colaptes auratus	Northern Flicker
Cyanocitta cristata	Blue Jay*
Dumetella carolinensis	Gray Catbird*
Hirundo rustica	Barn Swallow*
Melospiza melodia	Song Sparrow*
Poecile atricapilla	Black-capped Chickadee*
Quiscalus quiscula	Common Grackle*
Troglodytes aedon	House Wren*
Turdus migratorius	American Robin*
Tyrannus tyrannus	Eastern Kingbird
Zenaida macroura	Mourning Dove
AMPHIBIANS/REPTILES	
Chrysemys picta	Eastern painted turtle*
Rana clamitans	Green frog*
Rana sphenocephala	Southern leopard frog*
Thamnophis sirtalis	Common garter snake*
MAMMALS	
Odocoileus virginianus	White-tailed deer*
Procyon lotor	Raccoon*
INSECTS	
Papilio glaucus	Tiger swallowtail
Family *Acrididae*	Short-horned grasshoppers*
Order *Mantodea*	Praying mantis species*
Order *Odonata*	Red dragonflies
Order *Odonata*	Blue damselflies
Libellula pulchella	Twelve-spot skimmer*

*Observed in 2011

SOILS

During the 2011 site visit, soil characteristics and textures were not specifically examined due to the fact that this had previously been done in June 2005. Results of the soil profile review were presented in the Wetland Mitigation Construction Final Report, dated August 28, 2005, and are again presented below (Table 5).

Table 5. Soil profile review

	Soil Depth	Munsell Soil Color	Soil Texture
Boring 1 (40.54.15.00748N 74.34.31.41719W)	 0-10” 10-20”	 10YR 4/3 10YR 3/3	 Loam Loam
Boring 2 (40.54.14.42438N 74.34.31.14259W)	 0-13” 13-20”	 10YR 4/2 10YR 3/2	 Loamy clay Loamy clay
Boring 3 (40.54.13.75148N 74.34.31.31904W)	 0-15” 15-20”	 10YR 4/3 10YR 3/1	 Loam Loamy clay
Boring 4 (40.54.13.94790N 74.34.29.98567W)	 0-2” 2-20”	 10YR 4/3 10YR 3/2	 Loam Loam
Boring 5 (40.54.14.63046N 74.34.29.45719W)	 0-9” 9-20”	 10YR 4/3 10YR 3/2	 Loam Loam
Boring 6 (40.54.12.80847N 74.34.34.70682W)	0-20”	10YR 3/3	Loam

SEDIMENTATION AND EROSION CONTROL

There were no signs of erosion problems on the days the site was investigated. The potential for erosion issues has decreased due to the site’s current vegetative cover. Due to complete vegetation establishment across the mitigation area, the potential for erosion has been effectively eliminated.

CONCLUSIONS

The mitigation area was constructed during an extremely dry growing season, and late installation of seed and bare root trees, as well as herbivory by white-tailed deer and Canada Goose, were causes for the slow development of the mitigation wetland areas. During the May 29, 2008 site visit, 275 additional bare root trees and shrubs were installed with predator guards to compensate for the complete mortality of the 2005 woody plant installation. Despite the loss of the 2008 plantings, it is expected that the forested zone will continue to develop through natural succession as the large trees within and surrounding the mitigation wetland provide a heavy seed source for future colonization. Future sampling of this establishment will occur as the small seedlings identified during the 2011 site visits increase in size. The potential for future site work has prevented any further planting of bare root trees within the mitigation area. The

actual percent cover by native wetland species has increased since construction of the site, but still remains lower than the required 85% cover by native wetland species. The diversity of each of the zones is very high with consideration to the size of each zone. During the 2011 site visits there were 87 species identified in the emergent zone, 98 species in the forested zone, and 73 species in the transition zone.

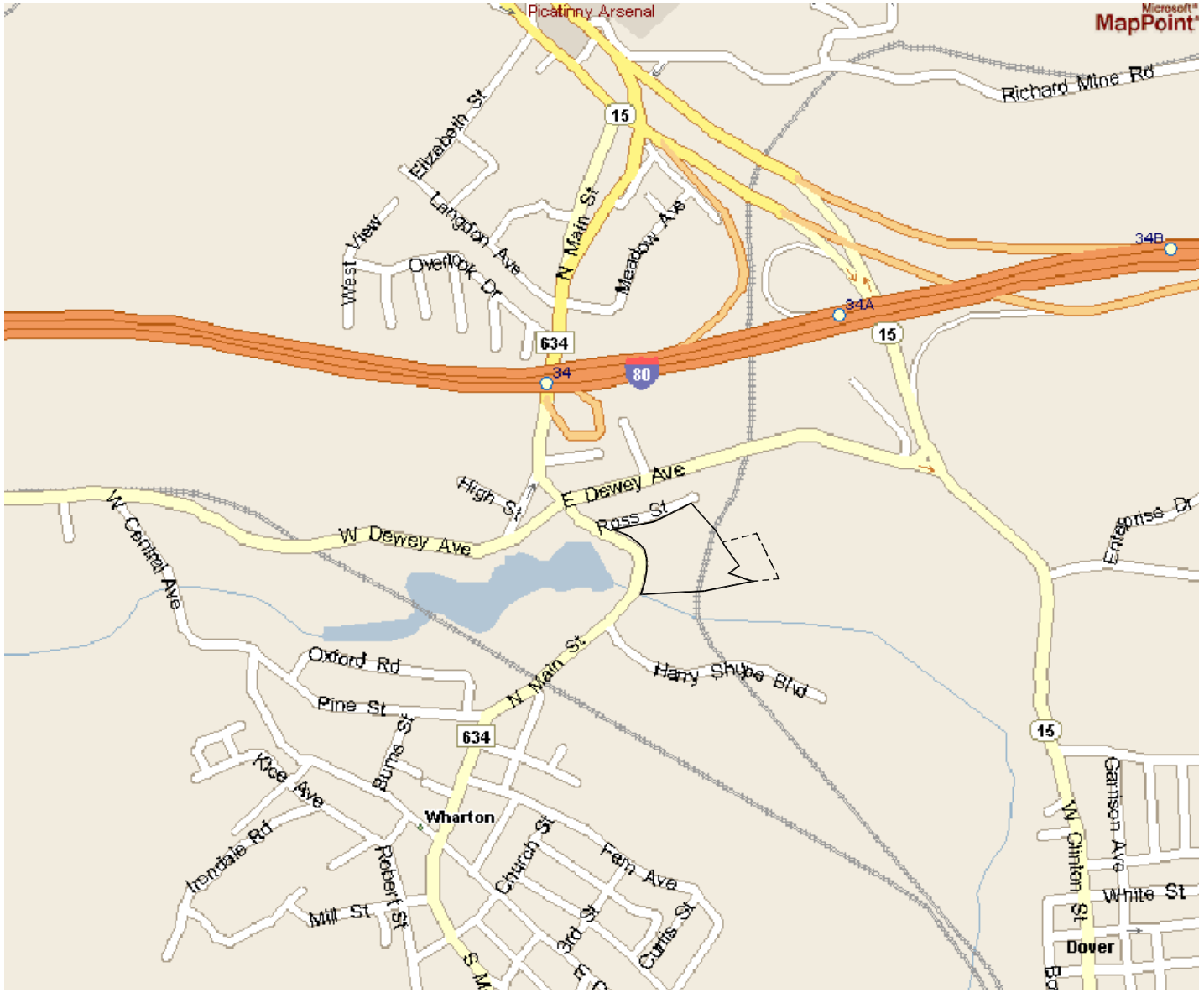
At this time, it is recommended that LEC continue maintenance visits for invasive species control to eliminate or effectively control their presence in the wetland mitigation and transition areas. While the invasive species control performed on the autumn olive and multiflora rose in 2010 reduced their populations, small shrubs continue to establish on site, and future visits will address the presence of these species on an as-needed basis.

Due to the fact that wetland communities surround the mitigation site and the elevations of the site were restored to pre-existing contours with no impedance to surface or groundwater flow, we expect that wetland and transition zone restoration will continue to progress and be successful.

REFERENCES

Gleason, Henry and Arthur Cronquist. 1991. *Manual of Vascular Plants of North-eastern United States and Adjacent Canada*. D. Van Nostrand Company, New York, New York. 910 pp.

Figures



LEGEND

- APPROXIMATE PROPERTY BOUNDARY

- EXPANDED PROJECT AREA

Cardno JFNew
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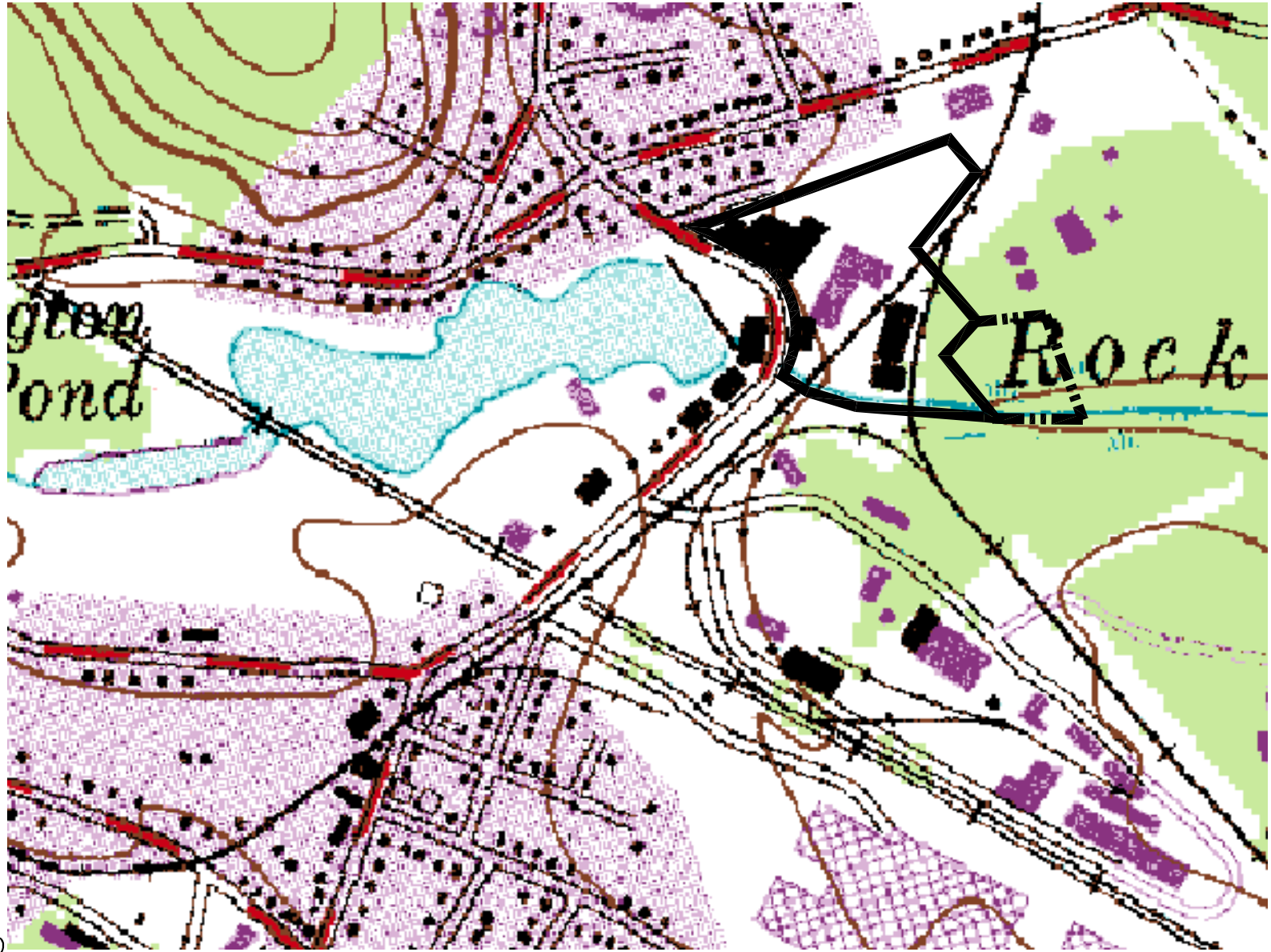
FIGURE 1 - LOCATION MAP

L.E. CARPENTER
WHARTON, NEW JERSEY

N

SCALE: NTS
DATE: 12.13.11
FILE: 040229LocationMap



LEGEND

- APPROXIMATE PROPERTY BOUNDARY

- EXPANDED PROJECT AREA

NOTES

STATE PLANE COORDINATES - 754326.58N 470891.83E (NAD83)

SOURCE:USGS DOVER,NJ QUADRANGLE

HUC-14 CODE 02030103030070

Cardno JFNew
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FIGURE 2 - USGS MAP

L.E. CARPENTER
WHARTON, NEW JERSEY

N

SCALE: NTS
DATE: 12.30.10
FILE: 040229USGSmap

RMT COMPUTER AIDED DESIGN AND DRAFTING

NOTES

1. AERIAL PHOTOGRAPH, DATED 2007.

N

0 60' 120' 180' 240'

SCALE IN FEET

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.				

L.E. CARPENTER
WHARTON, NEW JERSEY

FIGURE 3: 2007 AERIAL PHOTOGRAPH

DRAWN BY: SJL	SCALE:	PROJECT NO. 6527.02	
CHECKED BY: DD,NC	SHOWN	FILE NO. 6527.02	
APPROVED BY: NC	DATE PRINTED:	**FIGURE 3**	
DATE: APRIL 2004			

TRC Results you can rely on

1143 HIGHLAND DRIVE, SUITE B
ANN ARBOR, MI. 48108–2237

PHONE: 313–971–7080
FAX: 313–971–9022

PLOT DATA
Drawing Name: J:\06527\02\6527 Figure 03.dwg
Operator Name: lucidos
Scale: Shown
Dwg Size: 63193 Bytes
Plot Date: Wednesday, April 14, 2004
Plot Time: 08:57:2680 AM
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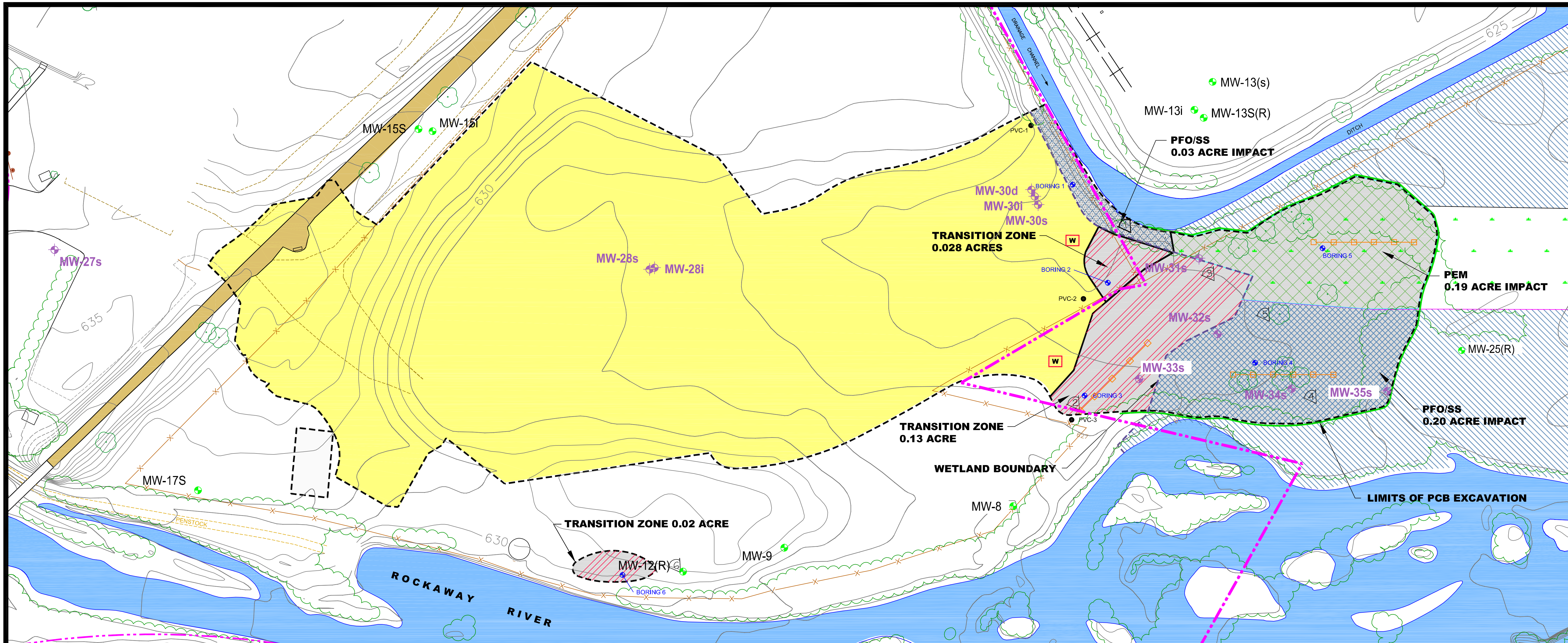
Layout Name: Aerial Photograph - Figure 3

RMT COMPUTER AIDED DESIGN AND DRAFTING



EMERGENT WETLAND (PEM) SEED MIX (0.19 acre)

NATIVE COMPONENT

Scientific Name	Common Name	Ounces/Acre
Acorus calamus	Sweet flag	8.50
Alisma subcordatum	Common water plantain	8.00
Echinochloa crusgalli	Barnyard grass	12.00
Eleocharis obtusa	Blunt spike rush	3.00
Iris virginica shrevei	Blue flag iris	4.00
Juncus effusus	Soft rush	3.00
Leersia oryzoides	Rice cut grass	4.00
Lobelia cardinalis	Cardinal flower	0.75
Lobelia siphilitica	Great blue lobelia	1.00
Mimulus ringens	Monkey flower	2.00
Peltandra virginica	Arrow arum	16.00
Polygonum pensylvanicum	Pinkweed	6.00
Pontederia cordata	Pickerelweed	8.00
Sagittaria latifolia	Common arrowhead	8.00
Scirpus validus	Softstem bulrush	6.00
Sparganium eurycarpum	Common burreed	10.00
	TOTAL	100.25 oz/acre = 6.27 lbs/acre

TEMPORARY COVER COMPONENT

Scientific Name	Common Name	Ounces/Acre
Agrostis alba	Redtop	16.00
Lolium multiflorum	Annual rye	400.00
	TOTAL	416.00 oz/acre = 26.00 lbs/acre

SLOPE STABILIZATION SEED MIX (0.21 acre)

NATIVE COMPONENT

Scientific Name	Common Name	Ounces/Acre
Andropogon gerardii	Big bluestem	20.00
Andropogon scoparius	Little bluestem	32.00
Bouteloua curtipendula	Side-oats grama	3.00
Elymus canadensis	Canada wild-rye	5.00
Panicum virgatum	Switch grass	12.00
Sorghastrum nutans	Indian grass	24.00
	TOTAL	96.00 oz/acre = 6.00 lbs/acre

TEMPORARY COVER COMPONENT

Scientific Name	Common Name	Ounces/Acre
Agrostis alba	Redtop	16.00
Elymus hystrix	Eastern bottlebrush grass	64.00
Lolium multiflorum	Annual rye	400.00
	TOTAL	480.00 oz/acre = 30.00 lbs/acre

WOODED WETLAND UNDERSTORY SEED MIX (0.20 acre)

NATIVE COMPONENT

Scientific Name	Common Name	Ounces/Acre
Actinomeris alternifolia	Wingstem	1.00
Alisma subcordatum	Common water plantain	3.00
Aster umbellatus	Flat-top aster	1.25
Bidens cernua	Nodding bur marigold	3.00
Calamagrostis canadensis	Blue joint grass	3.00
Carex crinita	Fringed sedge	2.00
Carex hystericina	Porcupine sedge	4.00
Carex lupulina	Common hop sedge	4.00
Carex vulpinoidea	Fox sedge	6.00
Chelone glabra	Turtlehead	1.25
Elymus canadensis	Canada wild rye	6.00
Elymus virginicus	Virginia wild rye	12.00
Glyceria striata	Fowl manna grass	4.00
Helenium autumnale	Sneezeweed	1.50
Leersia oryzoides	Rice cut grass	2.00
Lobelia silphilitica	Great blue lobelia	1.50
Mimulus ringens	Monkeyflower	1.75
Panicum virgatum	Switch grass	2.50
Rudbeckia laciniata	Wild golden glow	0.75
Scirpus atrovirens	Dark green rush	6.00
Spartina pectinata	Prairie cord grass	4.00
	TOTAL	70.50 oz/acre = 4.41 lbs/acre

TEMPORARY COVER COMPONENT

Scientific Name	Common Name	Ounces/Acre
Agrostis alba	Redtop	16.00
Elymus hystrix	Eastern bottlebrush grass	64.00
Lolium multiflorum	Annual rye	400.00
	TOTAL	480.00 oz/acre = 30.00 lbs/acre

BARE ROOT TREES (PFO/SS WETLAND) (0.20 acre)

Scientific Name	Common Name	Quantity
Acer saccharinum	Silver maple	25
Betula nigra	River birch	25
Fraxinus pennsylvanica	Green Ash	50
Quercus palustris	Pin oak	25
	TOTAL	125

BARE ROOT SHRUBS (CHANNEL SLOPE STABILIZATION) (0.03 acre)

Scientific Name	Common Name	Quantity
Cornus obliqua	Silky Dogwood	50
Salix discolor	Pussy Willow	50
	TOTAL	100

BARE ROOT TREES (TRANSITION ZONE) (0.18 acre)

Scientific Name	Common Name	Quantity
Acer saccharum	Sugar Maple	25
Juglans nigra	Black Walnut	25
Liriodendron tulipfera	American elm	50
Quercus rubra	Northern red oak	50
	TOTAL	150

LEGEND

- APPROXIMATE PROPERTY LINE
- FENCE LINE
- TREES
- PVC-1 — WETLAND RESTORATION AND TRANSITION ZONE BOUNDARY POINTS MARKED IN THE FIELD WITH 3-foot LENGTHS OF 3-inch WHITE PVC; LURP Special Condition 11c
- BORING 1 — BORING 1: NJDEP LURP REQUIRED SOIL BORINGS, Permit Condition 11e
- AREA OF SOURCE REDUCTION DISTURBANCE OUTSIDE OF REGULATED WETLAND AREA
- STATE OPEN WATERS
- WETLAND BOUNDARY
- LIMITS SOURCE REDUCTION PCB EXCAVATION WITHIN REGULATED WETLAND AREA
- PEM (EMERGENT WETLAND)
- PFO / SS (FORESTED / SCRUB-SHRUB WETLAND)
- PFO / SS IMPACT (0.23 ACRE)
- PEM IMPACT (0.19 ACRE)
- TRANSITION ZONE IMPACT (0.18 ACRE)

SAMPLE OR MONITORING LOCATION AND NUMBER

- TRANSECT LOCATION WITH PLOTS
- PHOTOSTATION LOCATIONS
- MW-25(R) — GROUNDWATER ELEVATION MONITORING WELL LOCATION AND NUMBER (s = shallow, i = intermediate, d = deep)
- MW-29s — PRMP MONITORING WELL LOCATION AND NUMBER

WETLAND SIGN LOCATION

- W — WETLAND MITIGATION PROJECT SIGN

NOTES

1. BASE MAP DEVELOPED FROM TOPOGRAPHIC SURVEY PROVIDED BY JAMES M. STEWART, INC. LAND SURVEYORS, DRAWING NO 2793-03.DWG, DATED 02-14-02.
2. TOTAL PROPOSED WETLAND IMPACT 0.42 ACRE.
3. PROPOSED DENSITY FOR TREE RESTORATION IS 10' ON CENTER.

N

0 30' 60' 90' 120'

SCALE IN FEET

Cardno JFNew
Western Michigan
11181 Marwill Avenue
West Olive, Michigan 49460
616-847-1680
www.cardnojfnew.com

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	BRM	12/14/09	MODIFY P/L	KR
1.	MPH	10/08/09	MODIFY P/L	KR

L.E. CARPENTER
WHARTON, NEW JERSEY

MITIGATION MONITORING MAP

DRAWN BY: SJL	SCALE: SHOWN	PROJECT NO. 6527.16
CHECKED BY: NC		FILE NO. 6527.16.01.DWG
APPROVED BY:	DATE PRINTED:	FIGURE 4
DATE: AUGUST 2005		

TRC Results you can rely on
1143 HIGHLAND DRIVE, SUITE B
ANN ARBOR, MI. 48108-2237
PHONE: 313-971-7080
FAX: 313-971-9022

JFN FILE: Grand Haven\PROJECTS\03_04\040229_RMT_NJ\CAD File\2009_MonitoringReport\20091008_MitMon_ASBUILTmap.dwg

PLOT DATA
Drawing Name: J:\06527\16\6527.16.01.dwg
Operator Name: lucidos
Scale: 1"=30'
Dwg Size: 857882 Bytes
Plot Date: Tuesday, August 16, 2005
Plot Time: 3:43.2375 PM
Attached Xref's: No xref's Attached.

Appendices

Appendix A:
Planting List

EMERGENT WETLAND IMPACT AREA (0.19 acre)

Emergent Wetland Seed Mix (32.27 pounds/acre)

Native Component

Scientific Name	Common Name	Ounces/Acre
Acorus calamus	Sweet flag	8.50
Alisma subcordatum	Common water plantain	8.00
Echinochloa crusgalli	Barnyard grass	12.00
Eleocharis ovata	Blunt spike rush	3.00
Iris virginica shrevei	Blue flag iris	4.00
Juncus effusus	Soft rush	3.00
Leersia oryzoides	Rice cut grass	4.00
Lobelia cardinalis	Cardinal flower	0.75
Lobelia siphilitica	Great blue lobelia	1.00
Mimulus ringens	Monkey flower	2.00
Peltandra virginica	Arrow arum	16.00
Polygonum pensylvanicum	Pinkweed	6.00
Pontederia cordata	Pickerelweed	8.00
Sagittaria latifolia	Common arrowhead	8.00
Scirpus validus	Softstem bulrush	6.00
Sparganium eurycarpum	Common burreed	10.00
TOTAL NATIVE FORBS AND GRASSES		100.25 = (6.27 lbs/acre)

Temporary Cover Component

Scientific Name	Common Name	Ounces/Acre
Agrostis gigantea	Redtop	16.00
Lolium perenne	Annual rye	400.00
TOTAL		416.00 = (26.00 lbs/acre)

FORESTED/SCRUB-SHRUB IMPACT AREA (0.20 acre)

Wooded Wetland Understory Seed Mix (34.41 pounds/acre)

Native Component

Scientific Name	Common Name	Ounces/Acre
Alisma subcordatum	Common water plantain	3.00
Aster umbellatus	Flat-top aster	1.25
Bidens cernua	Nodding bur marigold	3.00
Calamagrostis canadensis	Blue joint grass	3.00
Carex crinita	Fringed sedge	2.00
Carex hystericina	Porcupine sedge	4.00
Carex lupulina	Common hop sedge	4.00
Carex vulpinoidea	Fox sedge	6.00
Chelone glabra	Turtlehead	1.25
Elymus canadensis	Canada wild rye	6.00
Elymus virginicus	Virginia wild rye	12.00
Glyceria striata	Fowl manna grass	4.00
Helenium autumnale	Sneezeweed	1.50
Leersia oryzoides	Rice cut grass	2.00
Lobelia silphilitica	Great blue lobelia	1.50
Mimulus ringens	Monkeyflower	1.75
Panicum virgatum	Switch grass	2.50
Rudbeckia laciniata	Wild golden glow	0.75
Scirpus atrovirens	Dark green rush	6.00
Spartina pectinata	Prairie cord grass	4.00
Verbesina alternifolia	Wingstem	1.00
TOTAL NATIVE FORBS AND GRASSES		70.50 = (4.41 lbs/acre)

Temporary Cover Component

Scientific Name	Common Name	Ounces/Acre
Agrostis gigantea	Redtop	16.00
Elymus hystrix	Eastern bottlebrush grass	64.00
Lolium multiflorum	Annual rye	400.00
TOTAL		480.00 = (30.00 lbs/acre)

Native Trees and Shrubs

Scientific Name	Common Name	Quantity
Acer saccharinum	Silver maple	25
Betula nigra	River birch	25
Fraxinus pennsylvanica	Green ash	50
Quercus palustris	Pin oak	25
TOTAL TREES		125

DRAINAGE CHANNEL SIDESLOPE IMPACT AREA (0.03 acre)

Slope Stabilization Mix (36.00 pounds/acre)

Native Component

Scientific Name	Common Name	Ounces/Acre
Andropogon gerardii	Big bluestem	20.00
Bouteloua curtipendula	Side-oats grama	3.00
Elymus canadensis	Canada wild-rye	5.00
Panicum virgatum	Switch grass	12.00
Schizachyrium scoparium	Little bluestem	32.00
Sorghastrum nutans	Indian grass	24.00
TOTAL NATIVE GRASSES		96.00 = (6.00 lbs/acre)

Temporary Cover Component

Scientific Name	Common Name	Ounces/Acre
Agrostis gigantea	Redtop	16.00
Elymus hystrix	Eastern bottlebrush grass	64.00
Lolium perenne	Annual rye	400.00
TOTAL		480.00 = (30.00 lbs/acre)

Native Trees and Shrubs

Scientific Name	Common Name	Quantity
Cornus amomum	Silky dogwood	50
Salix discolor	Pussy willow	50
TOTAL TREES		100

TRANSITION ZONE IMPACT AREA (0.18 acre)

Slope Stabilization Mix (36.00 pounds/acre)

Native Component

Scientific Name	Common Name	Ounces/Acre
Andropogon gerardii	Big bluestem	20.00
Bouteloua curtipendula	Side-oats grama	3.00
Elymus canadensis	Canada wild-rye	5.00
Panicum virgatum	Switch grass	12.00
Schizachyrium scoparium	Little bluestem	32.00
Sorghastrum nutans	Indian grass	24.00
TOTAL NATIVE GRASSES		96.00 = (6.00 lbs/acre)

Temporary Cover Component

Scientific Name	Common Name	Ounces/Acre
Agrostis gigantea	Redtop	16.00
Elymus hystrix	Eastern bottlebrush grass	64.00
Lolium perenne	Annual rye	400.00
TOTAL		480.00 = (30.00 lbs/acre)

Native Trees and Shrubs

Scientific Name	Common Name	Quantity
Acer saccharum	Sugar maple	25
Juglans nigra	Black walnut	25
Liriodendron tulipifera	Tulip tree	50
Quercus rubra	Red oak	50
TOTAL TREES		150

2008 Supplemental Plantings

Native Trees and Shrubs

Scientific Name	Common Name	Quantity
Acer rubrum	Red maple	25
Acer saccharinum	Silver maple	25
Betula nigra	River birch	25
Cornus amomum	Silky dogwood	25
Cornus sericea	Red-osier dogwood	50
Liriodendron tulipifera	Tulip tree	25
Quercus palustris	Pin oak	25
Quercus rubra	Red oak	25
Salix nigra	Black willow	25
Ulmus americana	American elm	25
TOTAL TREES/SHRUBS		275

Appendix B:
Wetland Data Sheets

DATA ENTRY FORM

MITIGATION WETLAND MONITORING

Special Site Notes: None

Project Number: 040229

Project Name/Location: TRC/New Jersey

General Site Conditions: Good overall vegetative cover.

Date: September 19, 2011

Past and Present Weather: Wet summer; sunny day of site visit.

Site Hydrology: Saturated at surface to 7" of inundation

Wildlife: See report

VEGETATION SAMPLING DATA

Transect 1: Transition Zone

Plot Number	Species Names	Cover	Plot Number	Species Names	Cover
Plot 1	*Agrostis gigantea*	5%	Plot 4	*Agrostis gigantea*	25%
	Agrostis hyemale	8%		*Artemisia vulgaris*	4%
	Aster pilosus	3%		*Chrysanthemum leucanthemum*	2%
	Euthamia graminifolia	60%		*Coronilla varia*	2%
	Lotus corniculata	1%		*Euthamia graminifolia*	8%
	Lythrum salicaria	2%		*Lotus corniculata*	2%
	Potentilla simplex	5%		*Lythrum salicaria*	2%
	Solidago altissima	15%		*Potentilla simplex*	5%
	Sorghastrum nutans	2%		*Solidago altissima*	25%
	Verbena hastata	3%		*Sorghastrum nutans*	25%
				Verbena hastata	1%
Plot 2	*Agrostis gigantea*	10%			
	Andropogon gerardii	3%			
	Artemisia vulgaris	10%			
	Aster pilosus	4%	Plot 5	*Agrostis gigantea*	40%
	Daucus carota	1%		*Andropogon gerardii*	5%
	Plantago lanceolata	1%		*Artemisia vulgaris*	3%
	Potentilla simplex	15%		*Aster pilosus*	2%
	Rubus allegheniensis	8%		*Daucus carota*	1%
	Solidago altissima	10%		*Euthamia graminifolia*	3%
	Sorghastrum nutans	35%		*Lotus corniculata*	1%
				Potentilla simplex	2%
				Solidago altissima	5%
				Sorghastrum nutans	35%
Plot 3	*Ambrosia artemisiifolia*	4%			
	Artemisia vulgaris	25%			
	Aster pilosus	5%			
	Barbarea vulgaris	2%			
	Chrysanthemum leucanthemum	3%			
	Daucus carota	1%			
	Fragaria virginiana	5%			
	Lespedeza capitata	5%			
	Potentilla simplex	10%			
	Setaria glauca	2%			
	Solidago altissima	8%			
	Sorghastrum nutans	10%			

VEGETATION SAMPLING DATA		
Transition Zone Inventory		
Acer rubrum		*Lotus corniculata*
Achillea millefolium		*Lycopus americanus*
Agrostis gigantea		*Lythrym salicaria*
Agrostis hyemalis		*Melilotus officinalis*
Alliaria petiolata		*Myosotis scorpioides*
Ambrosia artemisiifolia		*Panicum virgatum*
Andropogon gerardii		*Parthenocissus quinquefolia*
Apocynum cannabinum		*Penstemon digitalis*
Artemisia vulgaris		*Phalaris arundinacea*
Aster pilosus		*Plantago lanceolata*
Barbarea vulgaris		*Plantago major*
Carex crinita		*Poa compressa*
Carex rosea		*Populus deltoides*
Carex vulpinoidea		*Potentilla simplex*
Chrysanthemum leucanthemum		*Quercus palustris*
Cirsium arvense		*Ranunculus acris*
Cornus amomum		*Rhus typhina*
Coronilla varia		*Rosa multiflora*
Daucus carota		*Rubus allegheniensis*
Elaeagnus umbellata		*Rudbeckia hirta*
Erigeron strigosus		*Rumex acetosella*
Eupatorium perfoliatum		*Rumex crispus*
Euthamia graminifolia		*Salix exigua*
Fragaria virginiana		*Schoenoplectus pungens*
Fraxinus pennsylvanica		*Setaria faberia*
Geranium maculatum		*Setaria glauca*
Glechoma hederacea		*Sisyrinchium angustifolium*
Helenium autumnale		*Solidago altissima*
Hieracium pilloselloides		*Solidago gigantea*
Hypericum perforatum		*Solidago rugosa*
Impatiens capensis		*Sorghastrum nutans*
Juncus effusus		*Taraxacum officinale*
Juncus tenuis		*Toxicodendron radicans*
Lespedeza capitata		*Typha angustifolia*
Lespedeza stipulacea		*Verbena hastata*
Linaria vulgaris		*Verbena urticifolia*
Lonicera morrowii		

VEGETATION SAMPLING DATA					
Transect 2: Emergent Wetland Zone					
Plot Number	**Species Names**	**Cover**	**Plot Number**	**Species Names**	**Cover**
Plot 1	*Agrostis hyemalis*	50%	Plot 4	*Agrostis gigantea*	5%
	Lythrum salicaria	1%		*Agrostis hyemalis*	30%
	Parthenocissus quinquefolia	2%		*Aster lanceolatus*	1%
	Phalaris arundinacea	25%		*Cyperus strigosus*	2%
	Pilea pumila	3%		*Desmodium ciliare*	2%
	Polygonum sagittatum	2%		*Eleocharis palustris*	2%
	Rosa multiflora	1%		*Epilobium coloratum*	5%
	Solidago gigantea	15%		*Euthamia graminifolia*	3%
	Typha angustifolia	2%		*Glechoma hederacea*	2%
	Typha latifolia	2%		*Juncus effusus*	10%
				Lamium purpureum	2%
				Lotus corniculata	1%
Plot 2	*Agrostis hyemalis*	15%		*Lythrum salicaria*	15%
	Cornus amomum	3%		*Solidago altissima*	10%
	Elaeagnus umbellata	7%		*Solidago gigantea*	10%
	Euthamia graminifolia	2%		*Solidago rugosa*	2%
	Impatiens capensis	1%			
	Juncus effusus	40%			
	Juncus tenuis	5%	Plot 5	*Agrostis hyemalis*	40%
	Lythrum salicaria	15%		*Ambrosia artemisiifolia*	2%
	Mentha piperita	2%		*Aster lanceolatus*	2%
	Polygonum sagittatum	1%		*Aster pilosus*	2%
	Rosa multiflora	3%		*Carex vulpinoidea*	15%
	Solidago altissima	7%		*Echinochloa crusgalli*	5%
				Epilobium coloratum	5%
				Euthamia graminifolia	10%
Plot 3	*Agrostis hyemalis*	15%		*Fraxinus pennsylvanica*	2%
	Cornus amomum	3%		*Glechoma hederacea*	5%
	Elaeagnus umbellata	7%		*Lythrum salicaria*	10%
	Euthamia graminifolia	2%		*Solidago altissima*	5%
	Impatiens capensis	1%			
	Juncus effusus	40%			
	Juncus tenuis	5%			
	Lythrum salicaria	15%			
	Mentha piperita	2%			
	Polygonum sagitattum	1%			
	Rosa multiflora	3%			
	Solidago altissima	7%			

VEGETATION SAMPLING DATA					
Transect 2: Emergent Wetland Zone					
Plot Number	**Species Names**	**Cover**	**Plot Number**	**Species Names**	**Cover**
Plot 6	*Agrostis hyemalis*	40%			
	Euthamia graminifolia	3%			
	Fraxinus pennsylvanica	1%			
	Juncus effusus	10%			
	Lotus corniculata	1%			
	Lythrum salicaria	3%			
	Polygonum aviculare	1%			
	Solidago altissima	10%			
	Solidago gigantea	8%			
	Sorghastrum nutans	25%			

VEGETATION SAMPLING DATA		
Emergent Wetland Zone Inventory		
Hydrology: Soil saturated at surface to 6 inundation.		
Species Names	**Species Names**	**Species Names**
Acalypha rhomboidea	*Fraxinus pennsylvanica*	*Polygonum punctatum*
Acer rubrum	*Geum canadense*	*Polygonum sagittatum*
Acer saccharinum	*Helenium autumnale*	*Polygonum virginianum*
Agrostis gigantea	*Impatiens capensis*	*Populus deltoides*
Agrostis hyemalis	*Iris virginica*	*Ranunculus acris*
Alliaria petiolata	*Juncus canadensis*	*Rosa multiflora*
Arisaema triphyllum	*Juncus effusus*	*Rubus occidentalis*
Asclepias incarnata	*Juncus tenuis*	*Rumex crispus*
Bidens cernuus	*Leersia oryzoides*	*Rumex obtusifolius*
Bidens frondosus	*Lespedeza stipulacea*	*Sagittaria latifolia*
Boehmeria cylindrica	*Lobelia cardinalis*	*Schoenoplectus pungens*
Carex crinita	*Lobelia siphilitica*	*Schoenoplectus tabernaemontani*
Carex hystericina	*Lonicera morrowii*	*Scirpus atrovirens*
Carex lurida	*Lotus corniculata*	*Setaria faberi*
Carex rosea	*Ludwigia palustris*	*Setaria glauca*
Carex vulpinoidea	*Lythrum salicaria*	*Sisyrinchium angustifolium*
Chrysanthemum leucanthemum	*Medicago lupulina*	*Solidago altissima*
Cirsium arvense	*Mentha arvensis*	*Solidago gigantea*
Cornus amomum	*Mentha piperita*	*Solidago rugosa*
Desmodium ciliare	*Mentha spicata*	*Solidago speciosa*
Echinochloa crusgalli	*Mikania scandens*	*Sorghastrum nutans*
Elaeagnus umbellata	*Mimulus ringens*	*Sparganium eurycarpum*
Eleocharis smallii	*Parthenocissus quinquefolia*	*Toxicodendron radicans*
Eleusine indica	*Phalaris arundinacea*	*Trifolium pratense*
Elymus virginicus	*Pilea pumila*	*Trifolium repens*
Epilobium angustifolium	*Plantago major*	*Typha angustifolia*
Epilobium coloratum	*Plantago rugelii*	*Typha latifolia*
Erechtites hieracifolia	*Poa compressa*	*Verbascum thapsus*
Euthamia graminifolia	*Polygonum persicaria*	*Verbena hastata*

VEGETATION SAMPLING DATA					
Transect 3: Forested Wetland Zone					
Plot Number	**Species Names**	**Cover**	**Plot Number**	**Species Names**	**Cover**
Plot 1	*Cyperus strigosus*	2%	Plot 4	*Agrostis hyemalis*	60%
	Helenium autumnale	3%		*Aster lanceolatus*	5%
	Lythrum salicaria	5%		*Epilobium coloratum*	10%
	Phalaris arundinacea	5%		*Euthamia graminifolia*	5%
	Pilea pumila	2%		*Helenium autumnale*	2%
	Polygonum sagittatum	2%		*Lythrum salicaria*	5%
	Scirpus atrovirens	3%		*Potentilla simplex*	1%
	Typha angustifolia	10%		*Rudbeckia laciniata*	2%
	Typha latifolia	50%		*Solidago gigantea*	15%
Plot 2	*Agrostis hyemalis*	25%	Plot 5	*Agrostis hyemalis*	45%
	Aster pilosus	2%		*Aster pilosus*	15%
	Arthraxon hispidus	5%		*Euthamia graminifolia*	20%
	Cyperus strigosus	2%		*Helenium autumnale*	5%
	Elymus virginiana	5%		*Lotus corniculata*	3%
	Euthamia graminifolia	5%		*Solidago altissima*	15%
	Helenium autumnale	20%		*Solidago gigantea*	5%
	Lythrum salicaria	25%			
	Setaria glauca	5%	Plot 6	*Agrostis hyemalis*	35%
	Solidago altissima	8%		*Euthamia graminifolia*	15%
	Solidago gigantea	5%		*Helenium autumnale*	10%
				Lamium purpureum	5%
Plot 3	*Agrostis hyemalis*	40%		*Lotus corniculata*	2%
	Aster pilosus	2%		*Rudbeckia laciniata*	15%
	Euthamia graminifolia	5%		*Solidago altissima*	30%
	Helenium autumnale	5%			
	Lythrum salicaria	10%			
	Potentilla simplex	3%			
	Rumex obtusifolius	5%			
	Solidago altissima	25%			

VEGETATION SAMPLING DATA		
Forested Wetland Zone Inventory		
Hydrology: Soil saturated to 7" inundation.		
Species Names	**Species Names**	**Species Names**
Acalypha rhomboidea	*Elymus virginicus*	*Plantago major*
Acer rubrum	*Epilobium angustifolium*	*Polygonum sagittatum*
Acer saccharinum	*Epilobium coloratum*	*Populus deltoides*
Achillea millefolium	*Erechtites hieracifolia*	*Potentilla simplex*
Agrostis gigantea	*Erigeron strigosus*	*Quercus bicolor*
Agrostis hyemalis	*Eupatorium maculatum*	*Quercus palustris*
Alliaria petiolata	*Eupatorium sessilifolium*	*Ranunculus acris*
Ambrosia artemisiifolia	*Euthamia graminifolia*	*Rosa multiflora*
Andropogon gerardii	*Fragaria virginiana*	*Rudbeckia laciniata*
Artemisia vulgaris	*Fraxinus pennsylvanica*	*Rumex crispus*
Arthraxon hispidus	*Glechoma hederacea*	*Rumex obtusifolius*
Asclepias incarnata	*Helenium autumnale*	*Salix exigua*
Aster lanceolatus	*Impatiens capensis*	*Saururus cernuus*
Aster pilosus	*Juncus effusus*	*Schoenoplectus pungens*
Aster umbellatus	*Lamium purpureum*	*Scirpus atrovirens*
Barbarea vulgaris	*Leonurus cardiaca*	*Scirpus cyperinus*
Betula pumila	*Lepidium campestre*	*Setaria glauca*
Bidens frondosus	*Liriodendron tulipifera*	*Solanum dulcamara*
Carex comosa	*Lobelia siphilitica*	*Solidago altissima*
Carex hystericina	*Lotus corniculata*	*Solidago gigantea*
Carex intumescens	*Lycopus americanus*	*Solidago rugosa*
Carex rosea	*Lythrum salicaria*	*Sorghastrum nutans*
Carex vulpinoidea	*Medicago lupulina*	*Symplocarpus foetidus*
Celastrus orbiculatus	*Mentha spicata*	*Thlaspi arvense*
Chrysanthemum leucanthemum	*Mikania scandens*	*Tilia americana*
Circaea lutetiana	*Onoclea sensibilis*	*Toxicodendron radicans*
Cornus amomum	*Oxalis stricta*	*Trifolium pratense*
Cyperus strigosus	*Panicum latifolium*	*Typha angustifolia*
Datura stramonium	*Panicum virgatum*	*Typha latifolia*
Daucus carota	*Pennisetum alopecuroides*	*Verbena hastata*
Desmodium ciliare	*Phalaris arundinacea*	*Verbena urticifolia*
Eleocharis obtusa	*Pilea pumila*	*Verbesina alternifolia*
Elymus canadensis	*Plantago lanceolata*	

Appendix C:
Photographs of
Wetland Development

Photo 1. Forested Zone facing west.

Photo 2. Emergent Zone facing east.

Site Photographs
September 19, 2011
L.E. Carpenter & Company
Wetland Restoration Area
Wharton, Morris County, New Jersey

Cardno JFNew
040229

Cardno JFNew
11181 Marwill Avenue West Olive, MI 49460
Phone 616-847-1680 / Fax 616-847-9970
www.jfnew.com

Photo 3. Emergent Zone facing west.

Photo 4. View of vegetation in Transition Zone.

Site Photographs
September 19, 2011
L.E. Carpenter & Company
Wetland Restoration Area
Wharton, Morris County, New Jersey

Cardno JFNew
040229

Cardno JFNew
11181 Marwill Avenue West Olive, MI 49460
Phone 616-847-1680 / Fax 616-847-9970
www.jfnew.com

Photo 5. Transition Zone facing southeast.

Cardno JFNew

11181 Marwill Avenue West Olive, MI 49460
Phone 616-847-1680 / Fax 616-847-9970
www.jfnew.com

Appendix D:
NJDEP Permit 1439-04-0001.1

State of New Jersey
Department of Environmental Protection

Richard J. Codey
Acting Governor

Bradley M. Campbell
Commissioner

Land Use Regulation Program
P.O. Box 439, Trenton, NJ 08625-0439
Fax # (609) 292-8115
www.state.nj.us/dep/landuse

FEB 25 2005

Mr. Nicholas Clevett
RMT, Inc., Michigan
2025 E. Beltline Avenue SE, Suite 402
Grand Rapids, MI 49546

RE: Authorization for Freshwater Wetlands Statewide General Permit No. 4
File No.: 1439-04-0001.1 (FWW 040001)
Applicant: L.E. Carpenter & Company
Block: 301; Lot: 1
Block: 801; Lots: 3, 4, & 5
Wharton Borough, Morris County
Nearest Waterway: Rockaway River
Passaic River Basin

Dear Mr. Clevett:

The Land Use Regulation Program has reviewed the referenced application for a Statewide General Permit authorization pursuant to the requirements of the Freshwater Wetlands Protection Act Rules at N.J.A.C. 7:7A. **The proposed activity is authorized by Statewide General Permit No. 4**, which allows regulated activities in freshwater wetlands, transition areas and State open waters for the investigation, cleanup or removal of hazardous substances or pollutants, which are undertaken, authorized or otherwise expressly approved in writing by the Department of Environmental Protection (Department).

Limit of Authorized Disturbance

The approved plans are prepared by RMT, Inc., dated February 21, 2005, last revised February 21, 2005, and entitled:

"L.E. Carpenter, Wetland and Stream Encroachment Permit Applications, Wharton, New Jersey"

"F3 – Wetland Impact Map", Sheet No. F3 of 7;
"F4 – Wetland Restoration Plan", Sheet No. F4 of 7;
"F5 – Construction Staging and Excavation Plan", Sheet No. F5 of 7;
"F6 – Final Grading Plan", Sheet No. F6 of 7;
"F7 – Details", Sheet No. F7 of 7

Based on the approved plans, the authorized activity involves the disturbance of approximately 0.42 of an acre of freshwater wetlands and/or State open waters and approximately 0.19 acres of wetland transition areas for removal of contaminated soil and restoration of the disturbed areas. Any additional disturbance of freshwater wetlands, State open waters or transition areas besides that shown on the approved plans shall be considered a violation of the Freshwater Wetlands Protection Act unless the activity is exempt or a permit is obtained prior to the start of the disturbance from the Land Use Regulation Program.

Permit Conditions

The activities allowed by this authorization shall comply with the following conditions. Failure to comply with these conditions shall constitute a violation of the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.).

Special Conditions

1. All regulated activities at this existing Superfund site must be in accordance with the requirements of the Department's Site Remediation Program and the United States Environmental Protection Agency, including any requirements contained within an approved Remedial Action Workplan.

2. In order to protect the trout maintenance and trout stocked waters of the Rockaway River, any proposed grading or construction activities within the banks of this river are prohibited between March 15 and June 15 of each year. In addition, any activity within the 100-year flood plain or flood hazard area of this watercourse which could introduce sediment into said stream or which could cause an increase in the natural level of turbidity is also prohibited during this period. The Department reserves the right to suspend all regulated activities on site should it be determined that the applicant has not taken proper precautions to ensure continuous compliance with this condition.

3. All backfill soils shall consist of clean, suitable material free from toxic pollutants in toxic amounts.

4. In addition to restoration of the wetland transition area as shown on the approved plan entitled "F4- Wetland Restoration Plan", the applicant shall also restore an area of wetland transition area not currently shown on the plan. This area extends 50' from the wetlands on the Wharton Enterprise property. These wetlands are classified as Intermediate resource value. This additional wetland transition area is drawn on the attached map portion. The restoration of this additional area shall be consistent with the notes on Sheet No. F4 of 7.

5. The mitigation project must be conducted prior to or concurrent with the construction of the approved project.

6. Mitigate for the loss of 0.16 acres of emergent wetlands and 0.26 acres of forested and scrub/shrub wetlands through an on-site restoration project as shown on the plan entitled "F4 - Wetland Restoration Plan, L.E. Carpenter, Wetland and Stream Encroachment Permit Applications, Wharton, New Jersey", dated February 21, 2005, last revised February 21, 2005, and prepared by RMT, Inc. In the event there is a conflict between the permit conditions and the approved mitigation plan and proposal the permit conditions take precedent.

7. The permittee shall notify the Land Use Regulation Program, in writing, at least thirty (30) days in advance of the start of construction of the wetland mitigation project for an on-site pre-construction meeting between the permittee, the contractor, the consultant and the Program.

8. The mitigation designer must be present during critical stages of construction of the mitigation project this includes but is not limited to herbicide applications, sub-grade inspection, final grade inspection, and planting inspection to ensure the intent of the mitigation design and their predicted wetland hydrology is realized in the landscape. Mitigation designs are not static documents and changes may be necessary to ensure success of the project. It shall be the prerogative of the mitigation consultant to make changes to the design should field conditions warrant such action.

9. Immediately following final grading of the site, a disc must be run over the site to eliminate compaction. The mitigation designer must be present to oversee this phase of the project and confirm with the Department this activity has occurred prior to planting of the site.

10. Immediately following the final grading of the mitigation site and prior to planting, the permittee shall notify the Program for a post-grading construction meeting between the permittee, contractor, consultant and the Program. The permittee must give the Program at least thirty (30) days notice prior to the date of this meeting.

11. Within 30 days following the final grading and planting of the mitigation project, the permittee shall submit a final report to the Land Use Regulation Program. The final report shall contain, at a minimum, the following information:

    a. A completed WETLAND MITIGATION PROJECT COMPLETION OF CONSTRUCTION FORM (attached) which certifies that the mitigation project has been constructed as designed and that the proposed area of wetland creation, restoration or enhancement has been accomplished;

    b. As built plans which depict final grade elevations at one foot contours and include a table of the species and quantities of vegetation that were planted including any grasses that may have been used for soil stabilization purposes;

    c. Show on the as-built plans that the boundaries of the wetland mitigation area has been visibly marked with 3 inch white PVC pipe extending 4 feet above the ground surface. The stakes must remain on the site for the entire monitoring period;

d. Photos of the constructed wetland mitigation project with a photo location map as well as the GPS waypoints in NJ state plane coordinates NAD 1983;

e. To document that the required amount of soil has been placed/replaced over the entire area of the mitigation site, provide a minimum of 6 soil profile descriptions to a depth of 20 inches. The location of each soil profile description should be depicted on the as built plan as well as provide the GPS waypoints in NJ state plane coordinates NAD 1983;

f. Submit soil test results demonstrating at least 8% organic carbon content (by weight) was incorporated into the A-horizon for sandy soil and for all other soil types 12% organic content or if manmade top soil was used it consisted of equal volumes of organic and mineral materials;

g. The permittee shall post the mitigation area with several permanent signs, which identify the site as a wetland mitigation project and that mowing, cutting, dumping and draining of the property is prohibited; and

h. The sign must also state the name of the permittee, LURP permit number along with a contact name and phone number.

12. If the Program determines that the mitigation project is not constructed in conformance with the approved plan, the permittee will be notified in writing and will have 60 days to submit a proposal to indicate how the project will be corrected. No financial surety will be released by the Program until the permittee demonstrates that the mitigation project is constructed in conformance with the approved plan, all soil has been stabilized and there is no active erosion.

13. The permittee shall monitor the mitigation project for 5 full growing seasons if it is a proposed forested or scrub/shrub wetland and 3 full growing seasons for an emergent wetland or State open water after the mitigation project has been constructed. The permittee shall submit monitoring reports to the Land Use Regulation Program no later than December 31st of each monitoring year (All monitoring reports must include the standard items identified in the attachment and the information requested below).

14. All monitoring report will include all the following information (see attached monitoring report checklist):

a. All monitoring reports except the final one must include documentation that it is anticipated, based on field data, that the goals of the wetland mitigation project including the transition area, as stated in the approved wetland mitigation proposal and the permit will be satisfied. If the permittee is finding problems with the mitigation project and does not anticipate the site will be a full success then recommendations on how to rectify the problems must be included in the report with a time frame in which they will be completed;

b. All monitoring reports except the final one must include field data to document that the site is progressing towards 85 percent survival and 85 percent area coverage of mitigation plantings or target hydrophytes (Target hydrophytes are non-invasive native species to the area and similar to ones identified on the mitigation planting plan). If the proposed plant community is a scrub/shrub or a forested wetland the permittee must also demonstrate each year with data that the woody species are thriving, increasing in stem density and height each year. If the field data shows that the mitigation project is failing to meet the vegetation survival, coverage and health goals, the monitoring

report should contain a discussion of steps that will be taken to rectify the problem, including a schedule of implementation;

c. All monitoring reports except the final one must include documentation of any invasive or noxious species (see below for list of species) colonizing the site and how they are being eliminated. The permittee is required to eliminate either through hand-pulling, application of a pesticide or other Department approved method any occurrence of an invasive/noxious species on the mitigation site during the monitoring period;

d. All monitoring reports except the final one must include documentation that demonstrates the proposed hydrologic regime as specified in the mitigation proposal appears to be met. If the permittee is finding problems with the mitigation project and does not anticipate the proposed hydrologic regime will be or has not been met then recommendations on how to rectify the problem must be included in the report along with a time frame within which it will be completed;

e. The final monitoring report must include documentation to demonstrate that the goals of the wetland mitigation project including the required transition area, as stated in the approved wetland mitigation proposal and the permit, has been satisfied. Documentation for this report will also include a field wetland delineation of the wetland mitigation project based on techniques as specified in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989);

f. The final monitoring report must include documentation the site has an 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes. The permittee must also document that all plant species are healthy and thriving and if the proposed plant community contains trees demonstrate that the trees are at least five feet in height;

g. The final monitoring report must include documentation demonstrating the site is less than 10 percent occupied by invasive or noxious species such as but not limited to *Phalaris arundinacea* (Reed canary grass), *Phragmities australis* (Common reed grass), *Pueraria lobata* (Kudzu), *Typha latifloia* (Broad-leaved cattail), *Typha angustifolia* (Narrowed leaved cattail), *Lythrum salicaria* (Purple loosestrife), *Ailanthus altissima* (Tree-of-heaven), *Berberis thunbergi* (Japanese barberry), *Berberis vulgaris* (Common barberry), *Elaeagnus angustifloia* (Russian olive), *Elaeagnus umbellata* (Autumn olive), *Ligustrum obtusifolium* (Japanese privet), *Ligustrum vulgare* (Common privet) and *Rosa multiforia* (Multiflora rose);

h. The final monitoring report must include documentation that demonstrates that the proposed hydrologic regime as specified in the mitigation proposal, which proves the mitigation site is a wetland has been satisfied. The documentation shall include when appropriate monitoring well data, stream gauge data, photographs and field observation notes collected throughout the monitoring period; and

i. The final monitoring report must include documentation that the site contains hydric soils or there is evidence of reduction occurring in the soil throughout the delineated wetlands.

15. Once the required monitoring period has expired and the permittee has submitted the final monitoring report, the Program will make the finding that the mitigation project is either a

success or a failure. This mitigation project will be considered successful if the permittee demonstrates all of the following:

a. That the goals of the wetland mitigation project including acreage and the required transition area, as stated in the approved wetland mitigation proposal and the permit, has been satisfied. The permittee must submit a field wetland delineation of the wetland mitigation project based on the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989) which shows the exact acreage of State open waters, emergent, scrub/shrub and/or forested wetlands in the mitigation area;

b. The site has an 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes which are species native to the area and similar to ones identified on the mitigation planting plan. All plant species in the mitigation area are healthy and thriving. All trees are at least five feet in height;

c. The site is less than 10 percent occupied by invasive or noxious species such as but not limited to *Phalaris arundinacea* (Reed canary grass), *Phragmities australis* (Common reed grass), *Pueraria montana* (Kudzu), *Typha latifloia* (Broad-leaved cattail), *Typha angustifolia* (Narrowed leaved cattail), *Lythrum salicaria* (Purple loosestrife), *Ailanthus altissima* (Tree-of-heaven), *Berberis thunbergi* (Japanese barberry), *Berberis vulgaris* (Common barberry), *Elaeagnus angustifloia* (Russian olive), *Elaeagnus umbellata* (Autumn olive), *Ligustrum obtusifolium* (Japanese privet), *Ligustrum vulgare* (Common privet) and *Rosa multiforia* (Multiflora rose);

d. The site contains hydric soils or there is evidence of reduction occurring in the soil; and,

e. The proposed hydrologic regime as specified in the mitigation proposal, which proves the mitigation site is a wetland has been satisfied.

16. If the mitigation project is considered a failure, the permittee is required to submit a revised mitigation plan to rectify the wetland mitigation site. The plan shall be submitted within 60 days of receipt of the letter from the Program indicating the wetland mitigation project was a failure.

17. The permittee shall assume all liability for accomplishing corrective work should the Program determine that the compensatory mitigation has not been 100% satisfactory. Remedial work may include re-grading and/or replanting the mitigation site. This responsibility is incumbent upon the permittee until such time that the Department makes the finding that the mitigation project is successful.

In addition to the above conditions and the conditions noted at N.J.A.C. 7:7A 4.3 and 5.4, the following general conditions must be met for the activity authorized under this Statewide General Permit:

General Conditions:

18. All fill and other earth work on the lands encompassed within this permit authorization shall be stabilized in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey" to prevent eroded soil from entering adjacent waterways or wetlands at any time during and subsequent to construction.

19. This permit is revocable in accordance with DEP regulations and State law.

20. The issuance of this permit shall not be deemed to affect in any way other actions by the Department on any future application.

21. The activities shown on the approved plans shall be constructed and/or executed in conformity with any notes and details on said plans and any conditions stipulated herein.

22. No change in plans or specifications shall be made except with the prior written permission of the Department.

23. The granting of this authorization shall not be construed to in any way affect the title or ownership of the property, and shall not make the Department or the State a party in any suit or question of ownership of the property.

24. This permit is not valid and no work shall be undertaken pursuant to this authorization until all other required federal, state, and local approvals, licenses and permits necessary for commencement of work onsite have been obtained.

25. A complete, legible copy of this permit shall be kept at the work site and shall be exhibited upon request of any person.

26. The permittee shall allow the Program the right to inspect the construction site and also shall provide the Bureau of Coastal and Land Use Compliance and Enforcement, NJDEP, 401 East State Street, P.O. Box 422, Trenton, New Jersey 08625 with written notification 7 days prior to the start of the authorized work.

27. This authorization is valid for five years from the date of this letter unless more stringent standards are adopted by rule prior to this date.

Transition Area

The wetlands affected by this permit authorization are of Ordinary and Intermediate resource value. The wetland located associated with the drainage channel located along the eastern side of the site are classified as Ordinary resource value. No standard transition area is required adjacent to Ordinary resource value wetlands. The wetlands located on the adjacent Wharton Enterprise property are classified as Intermediate resource value and have a standard required transition area or buffer of 50 feet. In addition, all of the wetlands are classified as priority wetlands by the United States Environmental Protection Agency since they drain into the Passaic River Basin. This General Permit includes a transition area waiver that allows encroachment only in that portion of the transition area that has been determined by the Department to be necessary to accomplish the regulated activities. Any additional regulated activities conducted within the standard transition area shall require a separate transition area

waiver from the Program. Regulated activities within a transition area are defined at N.J.A.C. 7:7A-2.6.

Consistency with the Areawide Water Quality Management Plan

This project has not been reviewed for consistency with the relevant Water Quality Management Plan or Statewide Water Quality Management Planning Rules (N.J.A.C. 7:15). As such, there is no intended or implied approval regarding additional permits which may be required from the Department. For treatment works approvals, the consistency determination will be performed by the Bureau of Engineering and Permitting (North/South) which may be contacted at (609) 292-6894 for North (Middlesex, Hunterdon and Counties north) or (609) 633-1139 for South (Mercer, Monmouth and Counties south). For general information concerning the water quality management planning process, please contact the Division of Watershed Management at (609) 633-1179.

Appeal of Decision

In accordance with N.J.A.C. 7:7A-1.7, any person who is aggrieved by this decision may request a hearing within 30 days of the decision date by writing to: New Jersey Department of Environmental Protection, Office of Legal Affairs, Attention: Adjudicatory Hearing Requests, P.O. Box 402, Trenton NJ 08625. This request must include a completed copy of the Administrative Hearing Request Checklist.

If you have any questions regarding this authorization, please contact Susan Michniewski of our staff at (609) 633-9277. Please reference the above file number.

Sincerely,

Mark A. Godfrey, Supervisor
Morris & Bergen Counties Region
Bureau of Inland Regulation

Attachments (map sketch, mitigation forms)

c. Anthony Cinque, Site Remediation Program
Jodale Legg, Land Use Regulation Program – Mitigation Unit
Nadine White, Land Use Regulation Program
Bureau of Coastal and Land Use Compliance and Enforcement
Wharton Borough Clerk
Wharton Borough Construction Official
Wharton Borough Planning Board
Wharton Borough Environmental Commission